Solar Minimum and Historical Events of the late Holocene Epoch

ANT 493 – Capstone Paper

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Introduction:

The catastrophic events of the late Holocene Epoch followed a cyclical pattern of Solar Minimum activity and were described by ancient people in literature. Ancient literature is often confusing with catastrophic events mixed between fantasy and non-fiction, thus being relegated to mythology rather than regarded as consequential explanation for catastrophism and Solar Minimum activity. Ancient people were adapted to their natural environment, paying particular attention to changes and phenomena seen as unnatural.

The creation of paradigms by ancient people to describe unnatural phenomena, such as destructive weather phenomena, is presented in mythological epics, creation stories, biblical literature, and through ancient symbolism. Mythology and symbolism provided ancient people with a rapid understanding of past unnatural catastrophic events. Analyzing ancient paradigms, such as those found in ancient literature used to describe mythological events, presents details of how catastrophic events were remembered by ancient people, but were undated following cyclical periods of solar minimum activity. A solar minimum period begins when sunspot activity decreases. Solar cycles can last for periods ranging from as short as seven to eleven years, or as long as 400 years (Popova, et al. 2017). The solar minimum is caused when the sun's magnetic field weakens, causing a decrease in solar material, called the solar wind. The sun's magnetic field, known as a magnetic shield, "deflects low-energy cosmic rays" from reaching the Earth (Tomassetti et al. 2017). When solar activity is high, at a solar peak, solar wind is low, with less cosmic radiation reaching the Earth. During the sun's solar minimum, the magnetic

field protecting the Earth is weakened and Earth receives more cosmic radiation. The result for civilizations on Earth is unpredictable swings in the climate appearing “simultaneously with other markers of social change” (Nelson & Khalifa, 2010).

Historical details, as interpreted through the use of the Hermeneutic approach, examines the ideas, meaning, and symbols created by ancient people. The Hermeneutic approach is used in the interpretation of paradigms found in literature. One way of understanding how catastrophic events shaped the past is to look at paradigms ancient people created to describe their environment. By pairing together ancient accounts of past environment, known solar activity data, climatic data, and geological activity, we get a clearer picture of how ancient civilizations were impacted during periods of cooling and geologic activity accompanying solar minimum activity.

This paper will examine any connection between solar cycle events and climate and civilization effects. In doing so, the results will demonstrate that periods of climate activity during solar minimum played a role in human activity during the late Holocene Epoch.

Theory:

While several climatological studies of the solar minimum and maximum peak are undertaken, none has compared historical events such as civilization collapse, catastrophism, mass migration, and mythological creation to periods of solar minimum activity.

To date there is no academic theory or evidence looking at solar activity and historical events, therefore, the needs exists for discussion into this area in order to expand our knowledge base. Using Plato’s reference to 300-year solar peak and trough cycles, this period was assigned to documented observable climatic markers, documented cultural/historical markers, and

occurrence of cultural mythology markers. However, I theorize 400-year cycles of warm or cold global temperatures will align with the majority of Plato's 300-year solar peak and trough cycles. Theorizing that 400-year cycles of global temperatures in solar peak and trough cycles exist, we understand sunspot activity is not static, which can create shorter or longer periods of solar peak and trough cycles to occur. Therefore, it is noted that both 300- or 400-year cycles are indeterminate solar activities that are not consistent enough to be called periodic solar cycles.

Predictions from theory

There is climatologic evidence of solar cycle peak and trough in global temperatures as noted in climatic studies of solar isotopes (Usoskin 2008). During solar maximums we would expect to see evidence of the rise of civilizations when the climate is warmer, and evidence of civilization collapse during solar minimums as the climate turns colder and geologic instability follows.

Methods:

The information presented are derived from Plato's 300-year solar peak and trough cycles, analysis of documented observable environmental, climatological, and geological data, documented cultural/historical markers, and the occurrence of cultural mythology markers.

Literature review was used to collect data for allegorical Hermeneutic analysis. This type of literature analysis discloses myth as a theoretical history in which all events are types of portents revealing historical cataclysm embedded within. Etymologic analysis of literature for climatic, meteorological, catastrophic, and geologic events was used to re-discover, re-construct, and re-create historical understanding. Using dates for past recorded solar minimum activity from climatological data and 330/400-year reoccurring time frame provided by Plato in *Myth of Er*, were used to reconstruct solar cycle pattern from 0-9800 BCE. It is noted that older dates for

physical artifacts that are used as cultural markers are established in academic literature by physical/chemical methods, like 14C, often with large statistical margins of probability (e.g., 8,500 +/- 250 years BP, even calibrated); and using historical dates, based on documents, which are subject to interpretation.

Climatic and geological literature review accumulated seventy-eight events representing climatic data covering a period of 9800 years (0-9800 BCE) during solar cycle peak and trough in global temperatures. Anthropologic and archaeologic literature review accumulated 103 cultural events covering a period of 9800 years (0-9800 BCE) during solar cycles. Historic literature review accumulated fifty-nine accounts of mythological effects occurring during solar cycle peaks and trough covering a period of 9800 years (0-9800 BCE).

This paper would like to demonstrate extremes for claims in observable climatic data, documented cultural/historical markers, and occurrence of cultural mythology markers by totaling the number of specific events from solar maximum and solar minimum, then divide by the number of events, and was completed on Excel spreadsheet (Table 1 & 2). These events were separated by peak solar minimum cycle (- 100, blue) or peak solar maximum cycle (100, red). Events from solar minimum or maximum period were numerated based on documented observable environmental climatic data, documented cultural/historical data, and occurrence of cultural mythology.

Table 1.

Period of solar sunspot minimum 1300-1550 BCE				
year	actual expected peak and trough	observation of climate evidence of peak and trough in global temps	cultural evidence of effects on civilization	mythological effects
-1300				
				1312 - Hebrew Golden Calf
				1350 - Hebrew Book of Judges
-1400	-100		End of Minoan civilization	Hebrew Book of Joshua
				1406 - Hebrew Book of Jubilee
				1435 - Origin of El - Ugaritic, Phoenician, Hebrew, Aramaic, Akkadian
				1446 - Hebrew Exodus
				1476 - Vedic Battle of Ten Kings
		Wettest Period - Chad		1478 - Battle of Megiddo
-1500		Begin Warm Period		
		End Cold Period	1520 - Egypt conquers Nubia	
		Volcanic Eruptions		1530 - Kaali crater, Estonia myth
			1550 - Famine - Egypt	1540s 1st appearance of fiery Phoenix

Table 2.

Period of solar sunspot maximum 1600-1894 BCE				
year	actual expected peak and trough	observation of climate evidence of peak and trough in global temps	cultural evidence of effects on civilization	mythological effects
-1600				Collapse of Walls of Jericho
		1650 - Mt Santorini erupts - Minoan Crete	1650 - Megiddo serpent cult #1	1650 - Hebrew Book of Numbers
				1686 - Israelites migrate into Egypt
			1700 - Knossos & Phaistos destroyed - Crete	Hindu Rig Veda - 360-day calendar
-1700	100		Era of Great Migration	
				1720 - Egyptian period - Hebrew bible
			1792 - Hammurabi law code written	
-1800		Sand incursion - Libya, Peru, Israel	Mass Migrations	
		Evaporation, severe arid condition - Mali		
		Cold event - China		
		Desiccation of Sahara		
		Begin Cold Period		
		End Warm Period		1877 - Sodom & Gomorrah event - Dead Sea
			1894 - Earliest flood narrative - The Atrakhasis - Akkadian	

Data:

Historical events such as civilization collapse, catastrophism, mass migration, and mythological creation are tied to periods of solar minimum activity. The data presented consists of information gathered from analysis of historical document review, climatic literature review, and recorded solar activity. Terms such as ‘rise’ of art/philosophy, mass migration, ‘culture rise’, the development of agriculture, ‘god origin’ are used as climatic, cultural and historic markers, indicating the occurrence of human activity in sync with solar cycle activity.

Climatic data covering a period of 9800 years (0-9800 BCE)

- Seventeen periods of solar maximum activity.
- Sixteen periods of solar minimum activity.
- Thirty-three periods of actual expected peak and trough solar cycles.
- Seventy-eight events representing climatic and geologic data covering a period of 9800 years (0-9800 BCE) during solar cycle peak and trough in global temperatures.
- Forty-five events representing climatic and geologic data during solar minimum activity.
- Thirty-four events representing climatic and geologic data during solar maximum activity.

Cultural evidence of solar cycle effects on civilization covering a period of 9800 years (0-9800 BCE)

- One hundred-three events representing cultural evidence covering a period of 9800 years (0-9800 BCE) during solar cycle peak and trough in global temperatures.
- Forty-four events representing cultural evidence during solar minimum activity.
- Fifty-nine events representing cultural evidence during solar maximum activity.

Mythological effects occurring during solar cycle peaks and trough covering a period of 9800 years (0-9800 BCE).

- Fifty-nine accounts of mythological effects occurring during solar cycle peaks and trough covering a period of 9800 years (0-9800 BCE).
- Twenty-five events representing mythological effects occurring during solar minimum activity.
- Thirty-two events representing mythological effects occurring during solar maximum activity.

Results:

300-year climatic data and solar minimum cycle

- Volcanic activity (42 BCE, 340 BCE, 1530 BCE, 1900 BCE, 5677 BCE, 5760 BCE)
- 8.2 Kilo year event occurred, decrease global temperatures. This is a global cooling event occurring in 6200 BCE.
- 5.9 Kilo year event occurred, decrease global temperatures. This is a global cooling event occurring in 3900 BCE.

- Drought leading to civilization collapse (1550 BCE – Egyptian New Kingdom; 3150 BCE – Pre- Dynastic Egypt).
- Drought leading to mass migration (5600 BCE, 6100 BCE)
- Cold climate in Southern Hemisphere coincides with founding of Maya Calendar (3114 BCE).

300-year climatic data and solar maximum cycle

- Drought leading to mass migration (1200 BCE, 3500 BCE, 3800 BCE)
- Earthquake leading to mass migration (1225 BCE)
- Volcanic eruptions (1650 BCE, 5400 BCE)
- Holocene Climate optimum (global warming period) (6000 BCE). This event lasted until 5000 BCE and is also referred to as Hypsithermal, Altithermal, Climatic Optimum, Holocene Optimum, Holocene Thermal Maximum, and Holocene Megathermal.
- Doggerland disappears beneath North Sea and English Channel (6000 BCE). The landmass was flooded by rising sea levels beginning around 6500 BCE, being submersed around 6000 BCE.
- Maximum warming period in Europe (7000 BCE) lead to rise of agriculture there (7000 BCE)

300-year cultural evidence and solar cycle

- Temple/Megalithic construction

    - 64% solar minimum (2112 BCE, 2500 BCE, 2630 BCE, 2750 BCE, 3900 BCE, 5000 BCE, 5100 BCE, 6900 BCE, 9130 BCE);
    - 36% solar maximum (534 BCE, 1250 BCE, 2900 BCE, 3000 BCE, 3600 BCE)
- Culture rise
    - 38% solar minimum (2686 BCE, 3900 BCE, 4400 BCE, 5000 BCE, 5500 BCE, 6300 BCE);
    - 62% solar maximum (63 BCE, 331 BCE, 1100 BCE, 1175 BCE, 4000 BCE, 5400 BCE, 5800 BCE, 5900 BCE, 6400 BCE, 7000 BCE)
- Culture collapse
    - 67% solar minimum (1400 BCE, 1550 BCE, 2193 BCE, 3150 BCE);
    - 33% solar maximum (540s BCE, 1177 BCE)
- Rise of agriculture (this indicates a world-wide event)
    - 50% solar minimum (6900 BCE);
    - 50% solar maximum (6500 BCE)
- Mass Migration
    - 57% solar minimum (3800 BCE, 3900 BCE, 5600 BCE, 6100 BCE);
    - 43% solar maximum (1200 BCE, 1700 BCE, 1800 BCE)
- Begin writing/mathematics
    - 56% solar minimum (1980 BCE, 2000 BCE, 2600 BCE, 3200 BCE, 3900 BCE);

    - 44% solar maximum (540s BCE, 2900 BCE, 3000 BCE, 3400 BCE)

- Begin calendar
    - 75% solar minimum (2773 BCE, 3114 BCE, 3761 BCE);
    - 25% solar maximum (1700 BCE)
- Cults
    - 33% solar minimum (2100 BCE) ;
    - 67% solar maximum (1250 BCE, 1650 BCE)
- Rise of Art/Philosophy
    - 0% solar minimum;
    - 100% solar maximum (1025 BCE, 2900 BCE, 7000 BCE)

300-year mythological effects and solar minimum cycle

- Creation dates
    - 50% solar minimum (5509 BCE);
    - 50% solar maximum (4004 BCE)
- God origin
    - 100% solar minimum (3228 BCE, 3137 BCE, 3102 BCE, 2698 BCE, 1435 BCE, 800s BCE);
    - 0% solar maximum
- Epics/Literature

    - 75% solar minimum (900s BCE, 2112 BCE, 3137 BCE);
    - 25% solar maximum (1274 BCE)
- Biblical Literature
    - 47% solar minimum (168 BCE, 200 BCE, 610 BCE, 1312 BCE, 1350 BCE, 1400 BCE,1446 BCE, 1406 BCE);
    - 53% solar maximum (480 BCE, 500s BCE, 1000 BCE, 1100 BCE, 1200 BCE, 1250 BCE, 1290 BCE, 1650 BCE, 1877 BCE)
- Geology (this event coincides with worldwide volcanic activity during a drop in global temperature)
    - 100% solar minimum (1530 BCE);
    - 0% solar maximum
- Mythical war (these events coincide with occurrence of earthquakes and volcanic eruption in Aegean and Mediterranean seas and mainland China brought on by cooling event, and drought in the Levant)
    - 33% solar minimum (1476 BCE, 1478 BCE);
    - 67% solar maximum (1260 BCE, 1274 BCE, 1600 BCE, 2852 BCE)
- Founding of Religions (this event occurs at the end of a cooling cycle and the beginning of a warming cycle)
    - 0% solar minimum;
    - 100% solar maximum (540s BCE, 42 BCE)

- Appearance of Myth creatures (mythical creatures are seen as fiery dragons, fiery phoenix's, centaurs, bovine, and serpents. Events coincide with rising sea levels, volcanic eruptions, and changes from cool climate to warmer temperatures)
    - 29% solar minimum (1312 BCE, 1540s BCE);
    - 71% solar maximum (42 BCE, 78 BCE, 540s BCE, 1025 BCE, 1040s BCE)
- Mythic Kings (kings appearing in mythology coincide with volcanic eruptions, and changes from cool climate to warmer temperatures)
    - 33% solar minimum (2698 BCE, 1476 BCE);
    - 67% solar maximum (3000 BCE, 2852 BCE, 1046 BCE, 1041 BCE)

Analysis:

- Theory presented is that Historical events such as civilization collapse, catastrophism, mass migration, and mythological creation occurred during periods of solar minimum activity. Questions needed to be answered include:
- Is there a connection between civilization collapse and sunspot activity?
- Does solar activity have anything to do with events occurring in civilization?
- Do theorized 400-year solar cycle peak and trough in global temperatures align with 300-year actual expected peak and trough activity?

Climatic/Geologic data and solar minimum cycle show:

- Higher probability for Drought leading to civilization collapse (1550 – Egyptian New Kingdom; 3150 – Pre- Dynastic Egypt).

- Higher probability for Drought leading to mass migration (5600 BCE, 6100 BCE). This event is a result of rapid global cooling during the 8.2 Kilo event.

Climatic/Geologic data and solar maximum cycle show:

- Higher probability of drought leading to mass migration (1200 BCE, 3500 BCE). This event coincides with peak and near peak solar maximum cycles.
- Higher probability for Earthquake activity leading to mass migration (1225 BCE).

During solar maximums we would expect to see evidence of the rise of civilizations when the climate is warmer, and evidence of civilization collapse during solar minimums as the climate turns colder and geologic instability follows.

Cultural evidence and solar minimum cycle show:

- Higher probability that as culture rises, Temple/Megalithic construction will occur.
- Higher probability that Temple/Megalithic construction will lead to development of writing/mathematics.
- Higher probability that as Mass Migration increases, Culture collapse will occur.
- Higher probability that as culture rises, will begin writing/mathematics.
- Higher probability that calendars begin during solar minimum cycle.
- No support for Rise of Art or Philosophy during solar minimum cycle.

Cultural evidence and solar maximum cycle show:

- Higher probability that as culture rises, so will the rise of Art/Philosophy.

- Higher probability that as Temple/Megalithic construction occurs, cults will also develop.
- Equal chance that as mass migration occurs, Culture collapse will occur.
- Less probability that as culture rises, Temple/Megalithic construction will increase.
- Less probability that as Culture rises, beginning writing/mathematics will occur.
- Less probability for calendars to begin during solar maximum cycle.

Mythological events coincide with rising sea levels, volcanic eruptions, and changes from cool climate to warmer temperatures.

Mythological effects and solar minimum cycle show:

- Higher probability of God origin occurring during solar minimum cycle.
- Higher occurrence of Epics/literature written during solar minimum cycle.
- Higher occurrence of geologic event with myth during solar minimum cycle.
- Equal probability for Creation dates to occur during solar minimum cycle.
- No support for founding of religions during solar minimum cycle.

Mythological effects and solar maximum cycle show:

- Higher probability for Appearance of Myth creatures during solar maximum cycle.
- Higher probability of Founding of Religions during solar maximum cycle.
- Higher occurrence of Mythic Kings and Mythical war occurring during solar maximum cycle.
- Higher probability of Biblical literature during solar maximum cycle.

- No occurrence of God origin during solar maximum cycle.
- No occurrence of Geology with myth during solar maximum cycle.

Conclusion:

Ancient people were particularly adapted to changes in their environment, and when possible described these changes in literature. Changes in patterns of solar cycle (0-9800 BCE) show that during periods of solar minimum cooling, civilization collapse, catastrophism, mass migration, and mythological creation occurred. Reacting to these environmental changes during periods of solar minimum activity, ancient people built megalithic temples, developed writing, mathematics, and calendars. The concept of god was invented, who held leading parts in environmental catastrophic epics, and prompting the rise of creation dates.

During solar maximum cycles, art, philosophy, and cults emerged. Biblical writing dominated mythical literature during these cycles, with higher probability for rise of mythical monarchs, and mythical wars fought. The founding of religions, and the appearance of mythical creatures have high probability of occurring during this solar cycle. Theorizing when solar activity was likely to peak, I looked to 400-year solar cycle peak and trough. When using an actualized 300-year cycle, my expected 400-year peak and trough activity had probability of occurring 89% of the time.

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